

AMENDMENTS TO THE CLAIMS

Please cancel Claims 1-33.

1-33. (Cancelled)

34. (Previously Presented) A method for detecting planarization of a top surface of a workpiece with features in an electrochemical mechanical deposition process that uses a solution containing a conductor therein and operates upon the top surface comprising:

depositing the conductor to fill the features within the top surface of the workpiece using electrochemical mechanical deposition employing a workpiece surface influencing device, an applied potential and the solution;

transmitting a beam of light onto the top surface of the workpiece to obtain a reflected beam of light, a characteristic of the reflected beam of light being altered by a top surface pattern that exists due to the features within the top surface of the workpiece; and

detecting, during electrochemical mechanical deposition, a change in the characteristic of the reflected beam of light indicative of a degree of planarization to the top surface of the workpiece.

35. (Previously Presented) The method according to claim 34 further including the step of terminating the electrochemical mechanical deposition at a predetermined degree of planarization.

36. (Previously Presented) The method according to claim 35 further including a material removal step.

37. (Previously Presented) The method according to claim 36 wherein the material removal step performs chemical mechanical processing.

38. (Previously Presented) The method according to claim 36 wherein the material removal step performs electrochemical mechanical polishing and further comprises the steps:

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting a change in a characteristic of the another reflected beam of light indicative of a another material on the top surface of the workpiece.

39. (Previously Presented) The method according to claim 38 wherein the beam of light and the another beam of light are from a same source.

40. (Original) The method according to claim 34 wherein the characteristic is intensity of the reflected beam of light.

41. (Original) The method according to claim 34 wherein the beam of light transmitted onto the top surface of the workpiece passes through the workpiece surface influencing device.

42. (Original) The method according to claim 41 wherein the characteristic is intensity of the reflected beam of light.

43. (Original) The method according to claim 34 wherein the beam of light transmitted onto the top surface of the workpiece is adjacent to the workpiece surface influencing device.

44. (Original) The method according to claim 43 wherein the characteristic is intensity of the reflected beam of light.

45. (Previously Presented) A method for detecting planarization of a top surface of a workpiece in an electrochemical mechanical deposition process that uses a solution containing a conductor therein, the method comprising:

electrochemically mechanically depositing the top surface of the workpiece using a workpiece surface influencing device, an applied potential and the solution to deposit material onto the top surface;

transmitting a beam of light onto the top surface of the workpiece to obtain a reflected beam of light; and

detecting, during electromechanical depositing, a change in a characteristic of the reflected beam of light indicative of a degree of planarization to the top surface of the workpiece.

46. (Previously Presented) The method according to claim 45 further including the step of terminating the electrochemical mechanical process at a predetermined degree of planarization of the top surface.

47. (Previously Presented) The method according to claim 46 further including the step of removing at least a portion of the material.

48. (Previously Presented) The method according to claim 47 wherein the step of removing performs chemical mechanical processing.

49. (Previously Presented) The method according to claim 47 wherein the step of removing performs electrochemical mechanical polishing and further comprises the steps:

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting a change in a characteristic of the another reflected beam of light indicative of a another material on the top surface of the workpiece.

50. (Previously Presented) The method according to claim 47 wherein the step of removing performs electrochemical mechanical polishing.

51. (Previously Presented) The method according to claim 45 wherein portions of the top surface is conductive and the step of electrochemically mechanically processing deposits a conductor into features disposed in the top surface of the workpiece.

52. (Previously Presented) A method for detecting planarization of a top surface of a workpiece having a plurality of features comprising:

depositing the conductor to fill the features within the top surface of the workpiece using electrochemical mechanical deposition; and

obtaining a signal indicative of a degree of planarity of the top surface during electrochemical mechanical deposition.

53. (Previously Presented) The method according to claim 52 wherein the step of obtaining comprises:

transmitting a beam of light onto the top surface of the workpiece to reflect the beam of light; and

detecting a characteristic of a reflected beam of light from the top surface; and transforming the characteristic into a signal which corresponds to the degree of planarity of the top surface.

54. (Previously Presented) The method according to claim 53 further including the step of terminating the step of depositing when the planarity of the top surface reaches a predetermined degree.

55. (Previously Presented) The method according to claim 54 further including a material removal step.

56. (Previously Presented) The method according to claim 55 wherein the material removal step performs electrochemical mechanical processing.

57. (Previously Presented) The method according to claim 55 wherein the material removal step includes:

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting a change in a characteristic of the another reflected beam of light indicative of another material on the top surface of the workpiece.

58. (Original) The method according to claim 53 wherein the characteristic is intensity of the reflected beam of light.

59. (Previously Presented) The method according to claim 58 wherein the intensity increases as the surface of the workpiece becomes more planar.

60. (Previously Presented) The method according to claim 34 wherein the conductor is copper.

61. (Previously Presented) The method according to claim 38 wherein the conductor is copper.

62. (Previously Presented) The method according to claim 38 wherein the another material is a barrier material.

63. (Previously Presented) The method according to claim 40 wherein the intensity increases as the degree of planarization increases.

64. (Previously Presented) The method according to claim 42 wherein the intensity increases as the degree of planarization increases.

65. (Previously Presented) The method according to claim 47 wherein the step of removing performs chemical mechanical polishing and further comprises the steps:

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting a change in a characteristic of the another reflected beam of light indicative of another material on the top surface of the workpiece.

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SUMMARY OF INTERVIEW

Exhibits and/or Demonstrations

None

Identification of Claims Discussed

Claims 34-65

Identification of Prior Art Discussed

“Admitted prior art” (which Applicants dispute) and U.S. Patent No. 6,176,992 to Lee et al.

Proposed Amendments

None.

Principal Arguments and Other Matters

Lee et al. does not teach or suggest use of end-point detection in deposition systems. The so-called “admitted prior art” is not prior art – the Background section does not “admit” that U.S. Patent No. 6,176,992 (and other cited applications at the paragraph beginning on p. 3, line 19 of the application as filed) are prior art. At best, these references constitute §102(e) prior art, but were subject to a common obligation of assignment at the time of the invention and so are unavailable under 35 U.S.C. §103(c) for obviousness rejections.

Results of Interview

It was agreed that the rejections over Lee et al. were overcome, and that Applicants would file a response asserting the common obligations of assignment for the so-called “admitted prior art.”